18 DEC 90

DURATION OF EXPOSURE AS A DETERMINANT OF LUNG CANCER RISK IN PASSIVE SMOKERS

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ABSTRACT

Age at first exposure to passive smoking (or age at first marriage to smoking husbands) in non-smoking women in Japan was observed to be about 8 years earlier than the age at first exposure to active smoking (or age at start of smoking) and was identified as an important risk factor which determines the extent of lung cancer risk elevation in non-smoking women with smoking husbands in addition to the amount of husbands smoking.

INTRODUCTION

Non-smoking wives with smoking husbands were observed to carry higher risk of lung cancer. The risk tended to go up with the increase in daily number of cigarettes smoked by the husbands (1, 2).

For lung cancer risk in active smokers the duration of exposure is considered as a key risk determinant which is even more important than daily amount of smoking (3). This might also be true for lung cancer risk in passive smokers. To examine the validity of the issue, the age at first exposure to passive smoking was studied for non-smoking wives with smoking husbands and compared with the age at start of smoking in active smokers in women in a large scale cohort study in Japan.

RESULTS

In case of non-smoking women, the exposure to passive smoking must start from the age at first marriage to smoking husbands. For lung cancer cases in non-smoking wives with smoking husbands the mean age at first marriage to smoking husbands was calculated as 22.47, while for lung cancer cases in smoking women the mean age at start of smoking was observed to be 30.40 (Table 1). This means the age at first exposure to passive smoking is 8 years earlier than the age at first exposure to active smoking. This must be an additional reason for the elevated lung cancer risk in non-smoking women with smoking husbands in Japan which should be considered when one compares extent of lung cancer risk elevation between passive and active smokers (Fig. 1).

In a large scale cohort study in Japan a nested case-control study conducted between 200 cases of lung cancer and 851 cases of controls (stomach cancer) revealed the earlier the age at first marriage the more striking the effect of husband smoking. In case of non-smoking women age under 59 married to smoking husbands the lung cancer risk adjusted to wives age and amount of husbands smoking was 4.95 (1.47-16.69)(case 18, control 61), 1.76 (1.10-2.80) (case 66, control 245), 1.41 (0.76-2.62)(case 31, control 117) when married at

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18 DEC 90

age 19 or earlier, at age 20-23 and at age 24 or older respectively, compared to the non-smoking women married to non-smoking husbands, corresponding frequency being 1, 10, 6 for cases and 18, 62, 31 for controls.

DISCUSSION

Many factors or conditions should be considered in comparing the lung cancer risk in passive smokers with the lung cancer risk in active smokers. Besides differences in chemical structure, in particular, the concentration of various carcinogens in side-stream smoke and main stream smoke, different route of inhalation (nose vs mouth), differences in the size of smoke particles resulting in the difference in places of deposition etc., the 8 years longer mean duration of exposure to tobacco smoke in passive smokers than in active smokers observed in the present paper must be kept in mind in interpreting the risk difference in both type of smokers.

In addition to the amount of exposure to passive smoking, the duration of exposure must be the pricipal lung cancer risk derterminants in passive smokers, just as in case of active smokers, as shown in the present appear by the higher lung cancer risk in women married at earlier age with smoking husbands.

This observation also strongly indicates the importance of the measurement of lung cancer risk due to the exposure to passive smoking from the childhood.

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Table 1

Age at First Exposure of Non-smoking Women to Spouse Smoking Is Much Younger than Age Began Smoking in Smoking Women

Womens' Age	age at first exposure of non-smoking women to passive smoking: number	%	age at first exposure of smoking women to active smoking: number	%
Total	154	100.0	87	100.0
- 19	29	18.8	1	1.1
20 - 24	98	63.6	30	34.5
25 - 29	26	16.9	11	12.6
30 - 34	1	0.6	20	23.0
35 -	0	-	25	28.7
Mean Age	22.47		30.40	
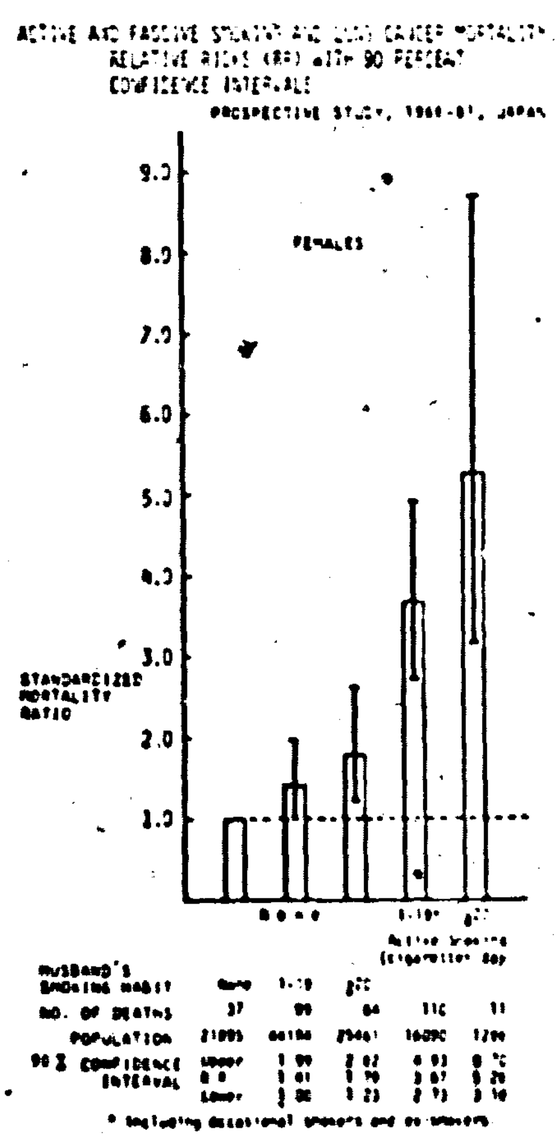
Fig. 1